

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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VENUE : _____

SEAT NO : _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2018/2019

TCP 1241 – COMPUTER PROGRAMMING II

(All sections / Groups)

31 MAY 2019
9:00 AM – 11:00 AM.
(2 Hours)

Question	Mark
1	
2	
3	
4	
Total	

INSTRUCTIONS TO STUDENT

1. This question paper consists of 12 printed pages (including cover page).
2. Attempt all questions. The distribution of the marks for each question is given.
3. Print all your answers **CLEARLY** in the specific answer box provided for each question. Submit this question paper at the end of the examination.

QUESTION 1 [10 marks]

Write C++ code to perform the following tasks:

- (a) Define an abstract base class named Quad. The class should have four values of type (float) representing the sides of a Quad and a pure virtual function Area that receives no parameters and returns a float value. It should also have accessors and mutators for the data members.

[3 Marks]

- (b) Derive a class Rectangle from Quad and override the Area method so that it returns the area of the Rectangle. The area will be computed by multiplying side1 and side3.

[2 Marks]

Continued...

- (c) Write a main function that declares a pointer named ptr to a Rectangle object. Then create dynamically an object of type Rectangle using the default constructor and assign this object to ptr.

[1 Mark]

- (d) Write a top-level function named getArea that will receive a parameter of type Quad pointer and returns a float value for the area of the Quad object.

[1.5 Marks]

- (e) Overload the == operator for the Rectangle class so that two Rectangles are said to be equal only if side1 and side2 of Rectangle A are equal to side1 and side2 of Rectangle B.

[2.5 Marks]

Continued...

QUESTION 2 [10 marks]

- (a) The following code crashes when run. Rewrite the set method in the MyArray class using exception handling so that the program will handle the exception displaying a message "Out of bound error !!!" and not crash. You must use the Error class in your handling of the exception.

[3 Marks]

```
#include <iostream>
using namespace std;

class Error{
    string error;
public:
    Error(string s="Out of bound error !!!"){
        error = s;
    }
    const char *what(){
        return error.c_str();
    }
};

class MyArray{
    int a[6];
public:
    void set(int index, int value){
        a[index] = value;
    }
};

int main() {
    MyArray a;
    for (int i=-1;i<7;i++){
        a.set(i,i*2);
    }
    return 0;
}
```

Continued...

- (b) Rewrite the following program using templates so that main function below can compile and run without errors. All methods' implementation must remain outside the class MPair.

[4 Marks]

```
#include <iostream>
using namespace std;

class MPair{
    int First;
    int Second;
public:
    void setPair(int x,int y);
    int getFirst();
    int getSecond();
    void print ();
};

void MPair::setPair(int x, int y) {
    First = x;
    Second = y;
}

int MPair::getFirst(){
    return First;
}

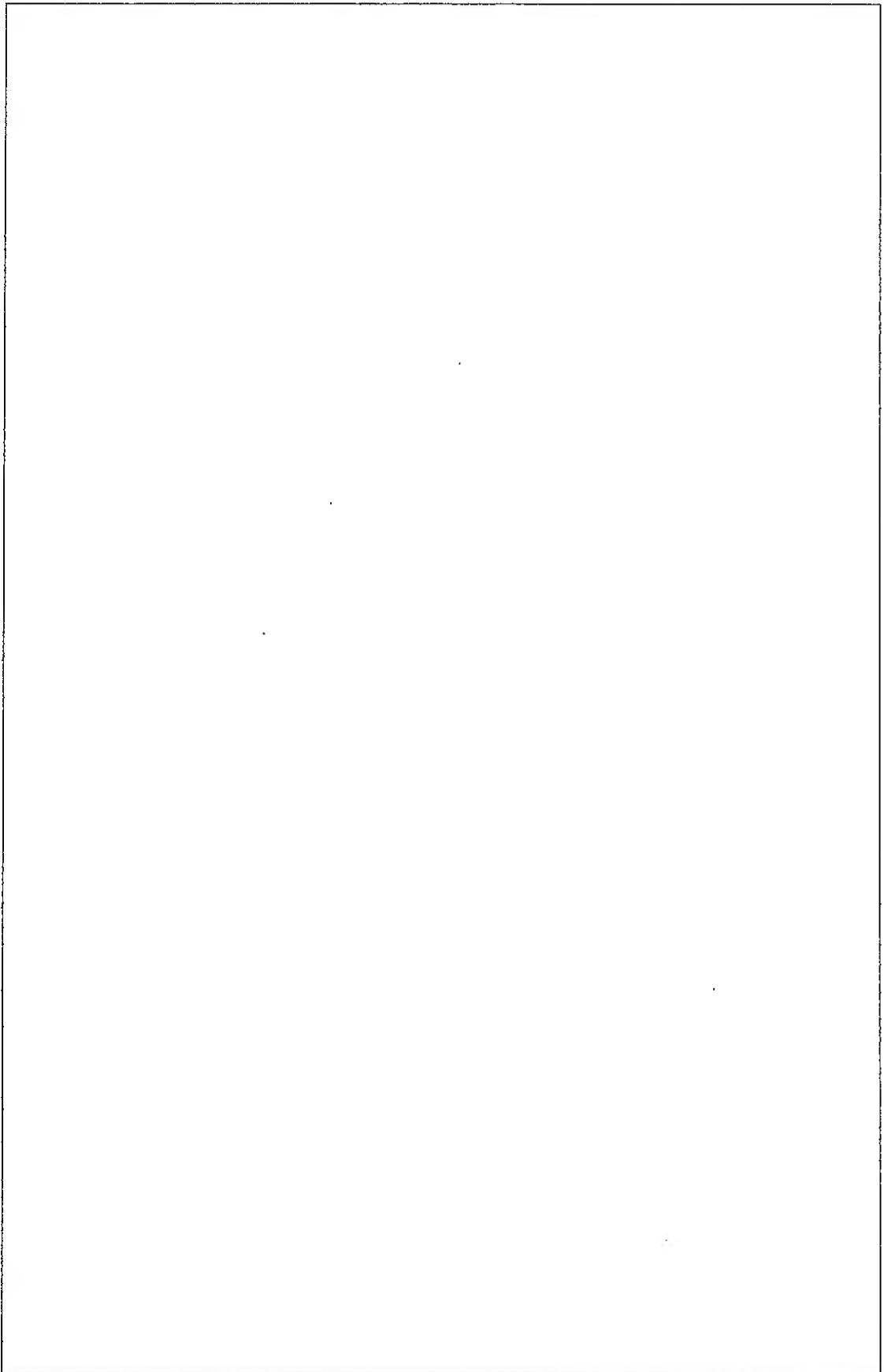
int MPair::getSecond(){
    return Second;
}

void MPair::print (){
    cout << getFirst() << ", "
    << getSecond() << endl;
}

int main() {
    MPair<int> pi;
    pi.setPair(4,3);
    pi.print(2);

    MPair<double> pd;
    pd.setPair(4.0,3.0);
    pd.print(1);
    return 0;
}
```

Continued...

**Continued...**

- (c) Implement the function reverse recursively so that it returns a reversed copy of the string.

[3 Marks]

```
#include <iostream>
using namespace std;

string reverse(string s){
}

int main() {
    cout << reverse(string("abcdefg")) << endl;
    return 0;
}
```

Sample output:
gfedcba

Continued...

QUESTION 3 [10 marks]

(a) What is the output generated when the following program is run?

[3 Marks]

<pre>#include <iostream> using namespace std; class Bird { public: virtual void noise() { cout << "mumble" << endl; } void move() { noise(); cout << "fly" << endl; } void noise2() { cout << "mumble2" << endl; } virtual void move2() { noise2(); cout << "fly2" << endl; } }; class Canary: public Bird { public: void noise() { cout << "chirp" << endl; } void move() { noise(); cout << "flap" << endl; } void noise2() { cout << "chirp2" << endl; } void move2() { noise2(); cout << "flap2" << endl; } };</pre>	<pre>class Tweety: public Canary { public: void noise() { cout << "tweet" << endl; } void move() { noise(); cout << "run" << endl; } void noise2() { cout << "tweet2" << endl; } void move2() { noise2(); cout << "run2" << endl; } }; int main() { Canary *a[2] = {new Tweety, new Canary}; for (int i=0;i<2;i++){ a[i]->noise(); a[i]->move(); a[i]->noise2(); a[i]->move2(); } return 0; }</pre>
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Answer:

Continued ...

- (b) Complete the following program that uses the C++ vector class using STL algorithms and iterators.

[3 Marks]

```
#include <iostream>
#include <algorithm>
#include <vector>
using namespace std;

int main() {
    vector<int> v {6,2,8,5,7,3,1,4};

    // sort the vector in ascending order using STL sort
    // algorithm

    // print out the first element in the vector. You are
    // not allowed to use the [] operator.

    // print out the elements of the vector using
    // iterators. You are not allowed to use the auto
    // keyword.

    return 0;
}
```

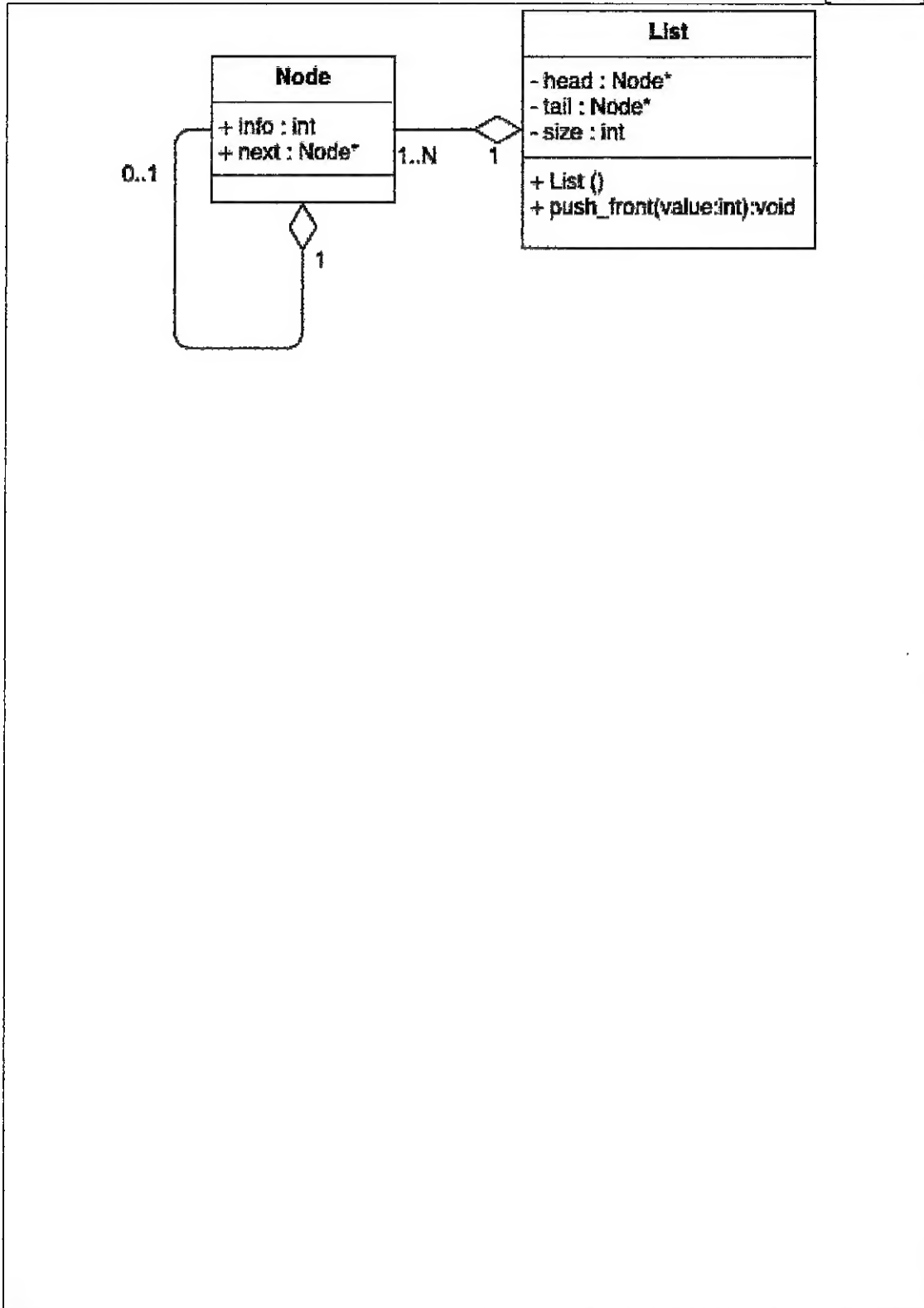
- (c) Explain the difference between overloading and overriding.

[2 Marks]

Continued ...

- (d) Write the equivalent C++ code that implements the following UML class diagram. You are expected to write the prototype of the List and push_front methods only.

[2 Marks]



Continued ...

QUESTION 4 [10 marks]

Consider the following partial class definition to answer sub sections (a) to (e).

```
class MyBox
{
    int *data;
    int size;
public:
};
```

- (a) Write an inline constructor that will receive an integer parameter [s] with a default value [5] and sets the size to [s] then, allocate an integer dynamic one dimensional array with size equals to s. Then initialize this array to the value -1.

[2.5 Marks]

- (b) Write an appropriate inline copy constructor

[2 Marks]

- (c) Write an appropriate inline Move constructor

[2 Marks]

Continued...

(d) Write an appropriate inline destructor

[1.5 Marks]

(e) Write an inline method [int Max()] that will return the maximum element in the array data of any MyBox object.

[2 Marks]

End of Page